

## PATENT SPECIFICATION (11)

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(54) DEVICE FOR CONTINUOUSLY MONITORING THE FUNCTIONING  
 OF RECORDING MEANS IN A TACHOGRAPH

(71) We, KEINZLE APPARATE G.m.b.H.,  
 a German Body Corporate, of Villingen-  
 Schwenningen, Germany, do hereby declare  
 the invention, for which we pray that a  
 patent may be granted to us, and the method  
 by which it is to be performed, to be par-  
 ticularly described in and by the following  
 statement:—

The invention relates to a device for  
 monitoring the operation of recording means  
 in a tachograph which is provided with  
 means for supporting and guiding at least  
 one time dependent drivable record carrier,  
 and at least one elastically mounted record-  
 ing pencil movable in a direction normal  
 to the record carrier when the latter is sup-  
 ported by said support means. According  
 to Patent Specification No. Application  
 50877/74 (Serial No. 1,454,948) the pressure  
 sensitive member is actuated indirectly —  
 via the diagram disk — and delivers a signal  
 current depending on the pressure exerted  
 by the recording pencil on the diagram disk.

According to the above mentioned parent  
 application a device for continuously moni-  
 toring the functioning of recording means in  
 a tachograph was to be designed avoiding  
 the disadvantages of known monitoring de-  
 vices. Such known monitoring devices are  
 for instance a device for immediately observ-  
 ing the recording position of the pencils due  
 to the transparency of the record carrier or  
 due to an optical deflection and indication  
 thereof. In another device an electrically  
 conductive special diagram disk is used  
 necessitating electrical connections to the re-  
 cording pencils. It was one of the objects  
 of the parent application to design a moni-  
 toring device which apart from being suited  
 for the series mounting also allows for a  
 simple modification and or a later addition  
 to such tachographs which are already in-  
 stalled. The known device is suited not only  
 for monitoring whether a diagram disk has  
 been inserted and the apparatus properly  
 closed but also whether the recording pen-  
 cils rest with sufficient recording pressure  
 on the diagram disk to obtain satisfactory  
 recordings.

The solution according to the parent ap-  
 plication, according to which electrical con-  
 tacts are attributed to the recording pencils  
 and fastened adjacent the supporting and  
 guiding surface of the diagram disk in such  
 manner that such contacts can be operated  
 only indirectly via the diagram disk, avoids  
 the disadvantages of known monitoring de-  
 vices and allows to attain the object with  
 the most simple means. Contrary to moni-  
 toring devices in which the recording pencils  
 are made themselves electrically conductive  
 or in which levers connected thereto have to  
 operate contacts, the monitoring device ac-  
 cording to the above mentioned parent ap-  
 plication is so designed that neither for  
 mounting the contacts do modifications of  
 the recording means and their mountings  
 have to be carried through, nor are there  
 any reactions on the recording pencils them-  
 selves during the monitoring due to an un-  
 favourable leverage or a tilting moment on  
 the recording pencils. A signal current is  
 generated by contacting only when a dia-  
 gram disk has been inserted in the tacho-  
 graph. Apart from that the contacts may  
 be adjusted so that it can be checked  
 whether they rest on the diagram disk with  
 the necessary recording pressure so that be-  
 sides the monitoring whether a diagram disk  
 has been inserted there is also a monitoring  
 of the recording pressure and thereby  
 whether recordings have been made.

Certain difficulties, however, result from  
 the embodiment as shown in the parent  
 application in that the movable foil con-  
 tact which is susceptible to creasing may be  
 easily damaged when inserting the diagram  
 disk. Also contacting may be interrupted  
 due to dirt, especially due to particles  
 abraded by the recording process which ac-  
 cumulates between the foil contact and the  
 firmly arranged counter contacts. These  
 difficulties are also due to the fact that the  
 foil contact, in order to be able to monitor  
 the operation of all recording pencils, must  
 extend over the whole radial recording range  
 so that it must have a relatively large area.

Considering the fact that a sufficiently

exact monitoring of the recording pencils may be achieved when the recording pressure of the pencils is checked only in their initial position an essential simplification of the monitoring device may be achieved and the above mentioned difficulties reduced. In many cases it is quite sufficient to monitor only those recording pencils as to the required recording pressure which serve to record the working times of the drivers as these recordings are known to be of special importance. The desired simplification of the monitoring device in this case is so much easier due to the fact that the recording pencils for producing stepped recording lines or bar diagrams require a relatively small radial recording range only so that no large area contacts are required.

The aim of the present invention, therefore, is that the monitoring device working on the principal as shown in Application 50877/74 (Serial No. 1,454,948) should be of such design and arrangement that there will be less disturbances as compared with the embodiment described in the parent application. This means it should be safe against any improper handling when inserting the diagram disk and against tampering, and contact interruptions due to a dirt should be practically impossible.

According to the present invention there is provided a device for monitoring the operation of recording means in a tachograph which is provided with means for supporting and guiding at least one time dependant drivable record carrier, and at least one elastically mounted recording pencil movable in a direction normal to the record carrier when the latter is supported by said support means, wherein an indirectly operated pressure sensitive member is provided which is actuatable through the intermediary of the record carrier when the latter is supported by said support means to deliver a signal current depending on the pressure exerted by the recording pencil on the record carrier and wherein the pressure sensitive member is arranged on the opposite side of said support means to the guiding surface thereof and wherein a sensor is arranged adjacent to and in operative contact with the pressure sensitive member in the support means and protruding through the guiding surface thereof.

It is another advantageous feature of the device according to the invention that the pressure sensitive member preferably consists of a set of leaf spring contacts in a housing which is arranged within the pot-shaped lid of the tachograph.

This embodiment is not suited for a continuous monitoring, especially for a continuous monitoring of the speed recording pencil which moves over a relatively wide radial recording range, however, it provides for

an essentially sufficient monitoring in the rest position of the pencils when the vehicle is at a standstill. Apart from the fact that one may continuously monitor the presence of a diagram disk the embodiment as now proposed allows for a continuous monitoring of the functioning of the working time recording pencils which make only a very limited radial recording movement so that the monitoring may be realised with least technical expenditure. The set of spring contacts used is a mass produced commercially available article and its arrangement within the lid of the tachograph makes sure that many of the usual causes for disturbances, such as dirt and damage due to improper handling, can be readily avoided. The device may also be easily exchanged since replacing or adding a set of contacts and the sensor attributed thereto especially with a corresponding design of the lid in production there will be no changes to be made on the tachograph nor will there be any adjustments necessary especially of the recording pencils.

In the following an embodiment of the invention will now be explained in detail with reference to the accompanying drawings. In these drawings

Fig. 1 is a diagrammatic section through the bottom of the lid of a tachograph, whilst

Fig. 2 is also a section along the line A—B in Fig. 1, however for a better illustration of the recording pencils, the diagram disk and the lid have been shown in an explosive view.

In Fig. 1 the bottom 1 of the tiltable lid 2 of a tachograph has been shown. The arrow 3 is supposed to indicate the opening direction of the lid 2, it being known that the lid 2 is generally in the form of a pot which is articulated to the basic housing of the tachograph containing the measuring systems and the recording means. In the lid housing in the most simple case there is a clockwork mechanism, the indicating means for the time and the speed as well as for the distance covered, and suitable lighting means which, however, as being unessential for the invention, have not been shown for reasons of simplicity. The reverse side of the bottom 1 turned to the interior of the tachograph housing serves as a supporting and guiding surface 5 to the diagram disks 4 serving as a record carrier, only one such disk being shown in Fig. 1. A central opening 6 in the bottom 1 serves to take up the tensioning device (not shown) for the diagram disks which on its part is fastened on the output shaft of the clockwork and serves to connect the diagram disks to the shaft so that they are driven in the direction of the arrow P. The bottom 1 of the lid is also provided with a longitudinal recess 7 into which the points of the recording

pencils 8, 9, 10 protrude if no diagram disk has been inserted in the tachograph. The recording pencils 8, 9 and 10, of which the pencil 8 is the speed recording pencil the pencil 9 the distance recording pencil and the pencil 10 serves to record the working and other operational data, have been shown in Fig. 2 in their initial position, that means when the vehicle is at standstill. They are under the action of springs which press them onto the diagram disk 4. Out of these springs only one spring 13 has been shown in Fig. 1 in connection with the working time recording pencil 10 which is tiltably arranged on a fixed portion 11 and may be brought to the various recording positions by means of a control lever 12 or may be rotated to produce various bar diagrams. The other recording pencils are mounted in similar manner in not shown recording levers which allow for a bigger radial recording range transverse to the transport direction of the diagram disk 4.

Associated with the work time recording pencil 10 there is a set 14 of contacts which in the most simple case consist of two preferably encapsulated leaf spring contacts 15 and 16. The highly elastic contact spring 15 is actuated by means of a sensor 17 mounted in the bottom 1, which sensor projects above the guide surface 5 of the diagram disk 4 when it is not actuated. As soon as a diagram disk has been inserted into the tachograph and the lid 2 closed the properly functioning recording pencil 10 under the effect of the spring 13 depresses the diagram disk 4 and thereby the sensor 17 from the guide surface 5 of the diagram disk 4. In order to enlarge the switching range the recess 7 in the supporting plane 5 is provided with slanted side faces 18 and 19. This means, as may be seen from Fig. 1, that the diagram disk may buckle into the recess 7 under the influence of the recording pencil, the slanted face 19 making sure that the diagram disk leaves the recess 7 with the least possible friction.

As was already explained in the introductory portion of the specification, for many applications it is sufficient to monitor the work time recording pencils only since in this way it is possible to check whether a diagram disk has been inserted into the tachograph. As may be seen from Fig. 2 bores 20 and 21 may be applied which can be used to fasten additional sensors attributed to the recording pencils 8 and 9. To supplement the monitoring device in this manner additional sets 22, 23 of leaf spring contacts may be added in a building set manner besides the already available set 14. Alternatively a suitable multiple set of contacts may be fastened to the interior of the

lid 2. Naturally instead of sets of leaf spring contacts also other switching elements may be used, for instance contacts which operate without touch. Also it is possible to use electrically conductive foils such as they have been shown in the parent application since on the one hand the switching distances of the sensors are relatively small and on the other hand the currents to be switched are not very big so that the conductive foils need no servicing.

The signal current delivered via the contact sets are treated in accordance with Fig. 4 of the parent application or when there is one set of contacts only in a correspondingly reduced and simplified circuit arrangement which has not been shown here for the sake of simplicity.

#### WHAT WE CLAIM IS:—

1. A device for monitoring the operation of recording means in a tachograph which is provided with means for supporting and guiding at least one time dependant drivable record carrier, and at least one elastically mounted recording pencil movable in a direction normal to the record carrier when the latter is supported by said support means, wherein an indirectly operated pressure sensitive member is provided which is actuatable through the intermediary of the record carrier when the latter is supported by said support means to deliver a signal current depending on the pressure exerted by the recording pencil on the record carrier and wherein the pressure sensitive member is arranged on the opposite side of said support means to the guiding surface thereof and wherein a sensor is arranged adjacent to and in operative contact with the pressure sensitive member in the support means and protruding through the guiding surface thereof.

2. A device according to claim 1, wherein the pressure sensitive member is arranged with the pot-shaped lid of the tachograph.

3. A device according to claims 1 and 2, wherein as the pressure sensitive member a set of spring electrical contacts is used which is fastened to the bottom of the lid.

4. A device according to claim 3 wherein the set of spring electrical contacts is encapsulated.

5. A device substantially as described herein, with reference to and as illustrated in the accompanying drawings.

For the Applicants:

MATTHEWS, HADDAN & CO.,  
Chartered Patent Agents,  
33, Elmfield Road,  
Bromley, Kent, BR1 1SU.

1459368

COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale

